

# ***Headquarters U.S. Air Force***

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## **Space: The Warfighter's Perspective**



**Major General Franklin J. Blaisdell  
Director, Space Operations & Integration  
AF/XOS**

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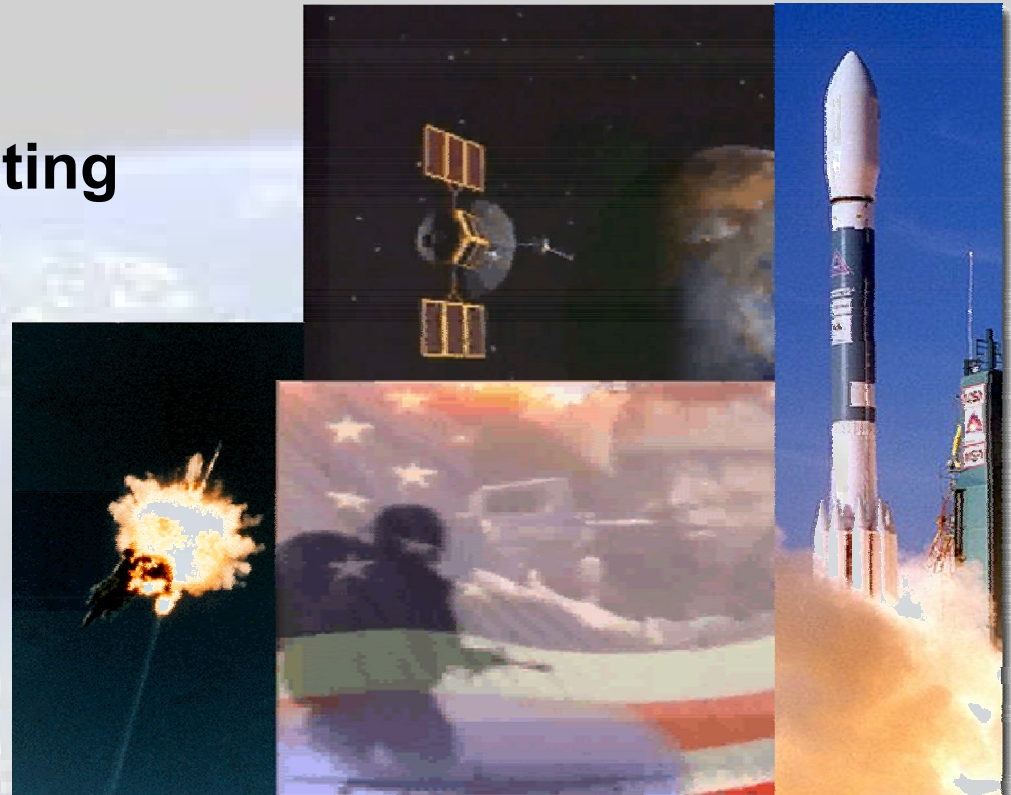
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# Overview

- Who We Are
- Technology-to-Warfighting
- Integrating Operations



***"... The United States is like a boiler. Once the fire is lighted under it, there is no limit to the power it can generate."***

**Sir Winston Churchill**

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# ***US Locations***

33,600 people in:



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# *Worldwide Locations*



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# ***Space Advantages***

## ■ **Ultimate high ground**

- **Global reach / coverage**
- **No overflight/access limitations**
- **No vulnerability to loss of life**

## ■ **Force multiplier**

- **Enhances air, land, & sea operations**
- **Enables precision strike**
- **Provides information superiority**

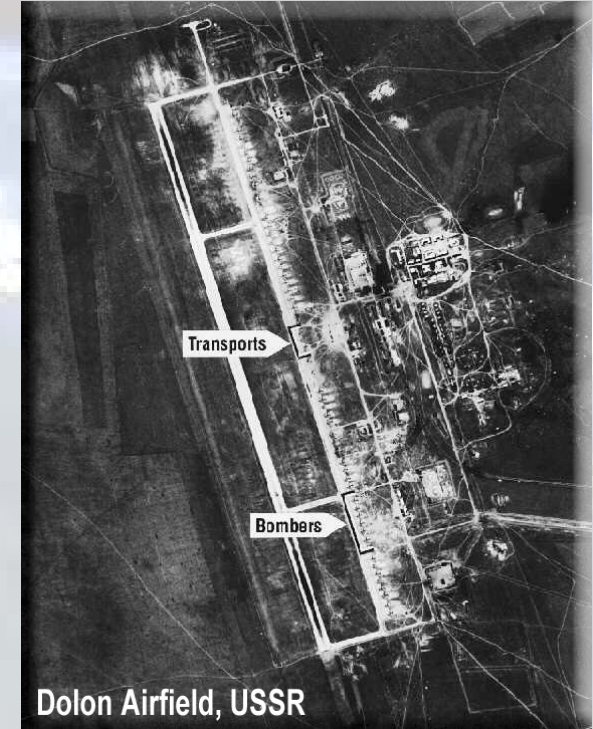
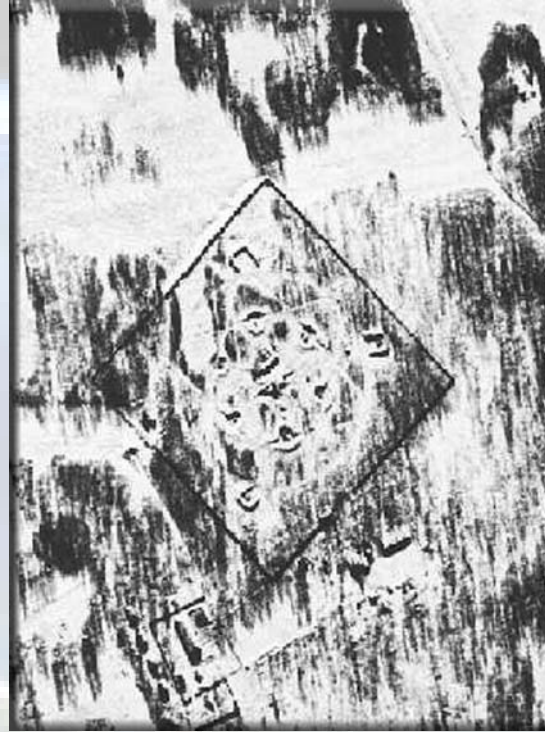
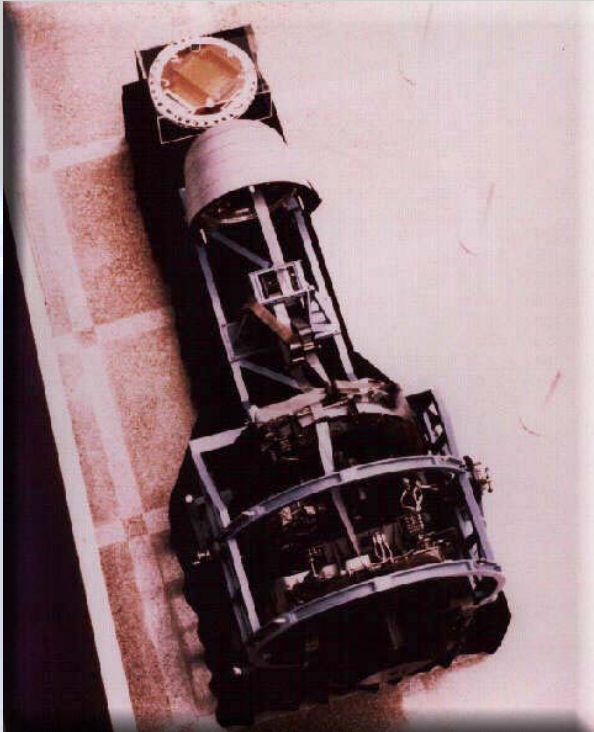


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# Why Space?



In one day, the Corona satellite photographed more Soviet territory than 28 U-2 missions had over four years.



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# *Why Space?*

## CHARACTERISTICS

Persistence

Perspective

Penetration

## CAPABILITIES

Missile Warning

Weather

Communications

Position, Nav,  
Timing

Space Intelligence,  
Surveillance,  
Reconnaissance  
Air, Land, Sea

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# *Space and Air Power Maximizing Combat Capability*







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# ***Technology-to-Warfighting***

## ***Missile Warning***

### **Defense Support Program**

- **Missile Warning**
- **Theater Missile Warning**
- **Support to Civil Authorities**
  - **Natural Disaster**
  - **Forest Fire**
  - **Volcano Ash Clouds**

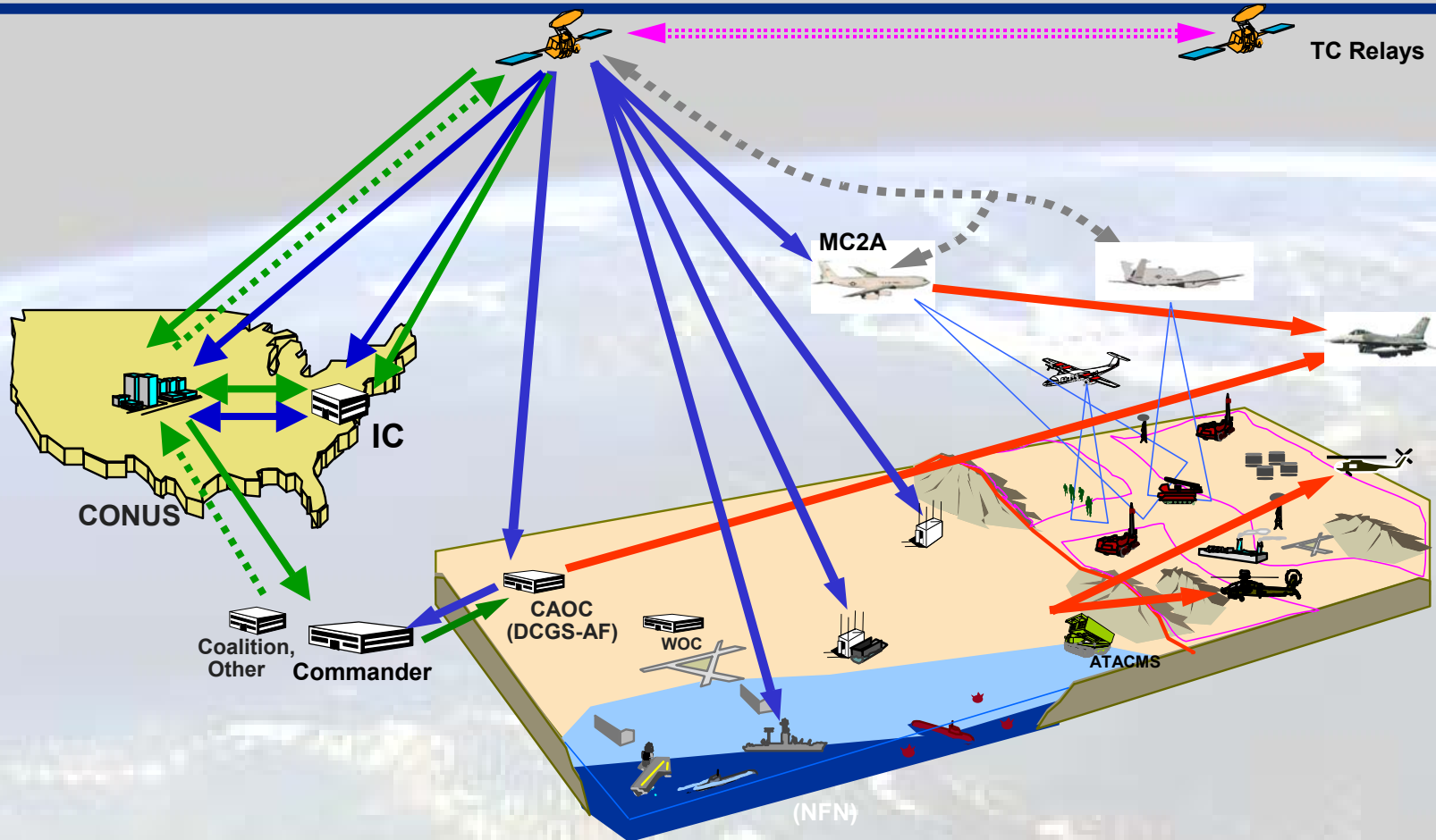
**Future: SBIRS**





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# Technology-to-Warfighting Communications



Space provides critical over-the-horizon connectivity enabling reachback and networked operations

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# Growing Bandwidth Needs

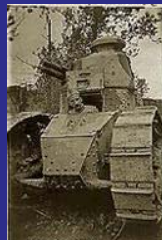
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Time Line

1865  
Civil War



1918  
WWI



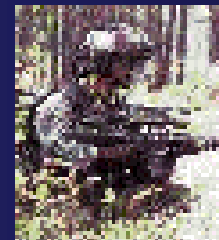
1945  
WWII



1991  
Gulf War



1999/2001  
Kos/OEF



2010+  
Future



Data  
Transfer  
Rate

32 BPS

32 BPS

71 BPS

256 KBPS

1.5 MBPS

25 GBPS

Soldiers to  
cover  $10^2$   
Km

38,830

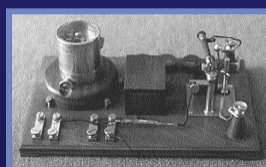
4,040

300

24

3

?



Technology

Telegraph

Telephone

Computer

VTC

Web Tools

Network  
Centric  
Warfare

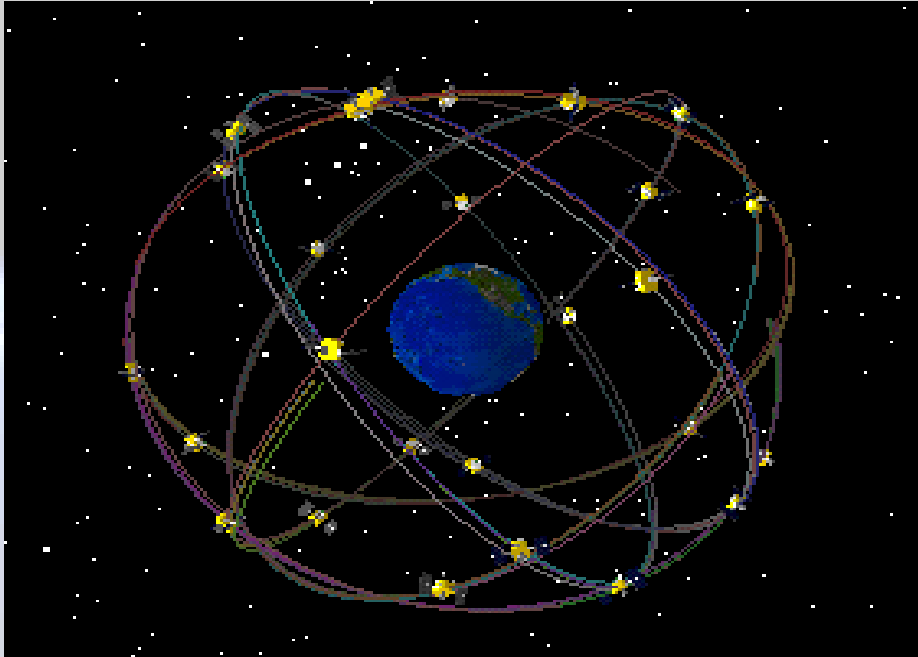
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# *Technology-to-Warfighting*

## *Position, Navigation and Timing*



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# *Technology-to-Warfighting*

## *Imagery Intelligence*



Al Qaeda training camp at Zhawar Kili in Afghanistan



IBN AL HAYTHAM MISSILE R & D CENTER, IRAQ



KIKINDA ARMY GARRISON, SERBIA

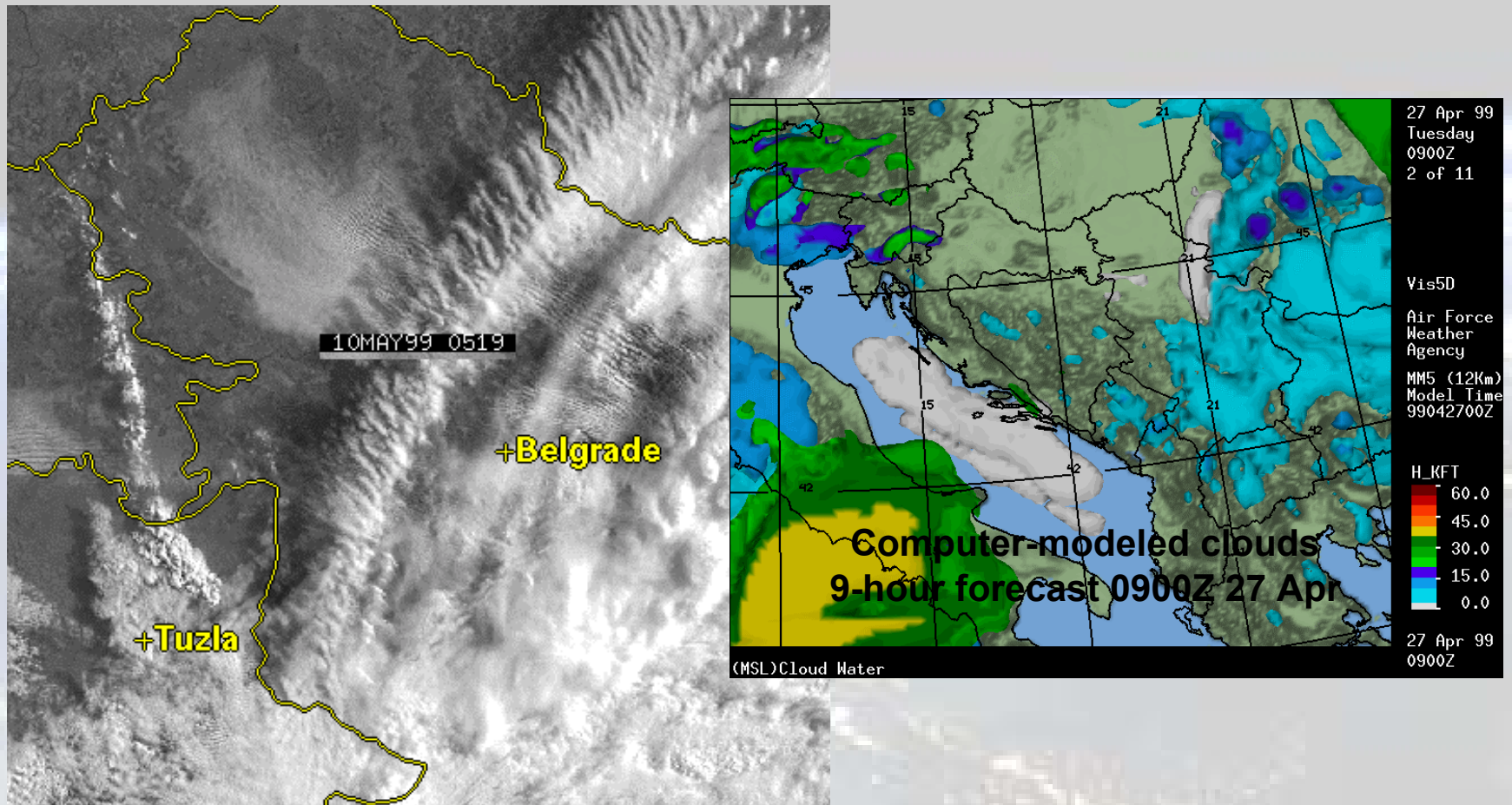
POST STRIKE

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# Technology-to-Warfighting Weather



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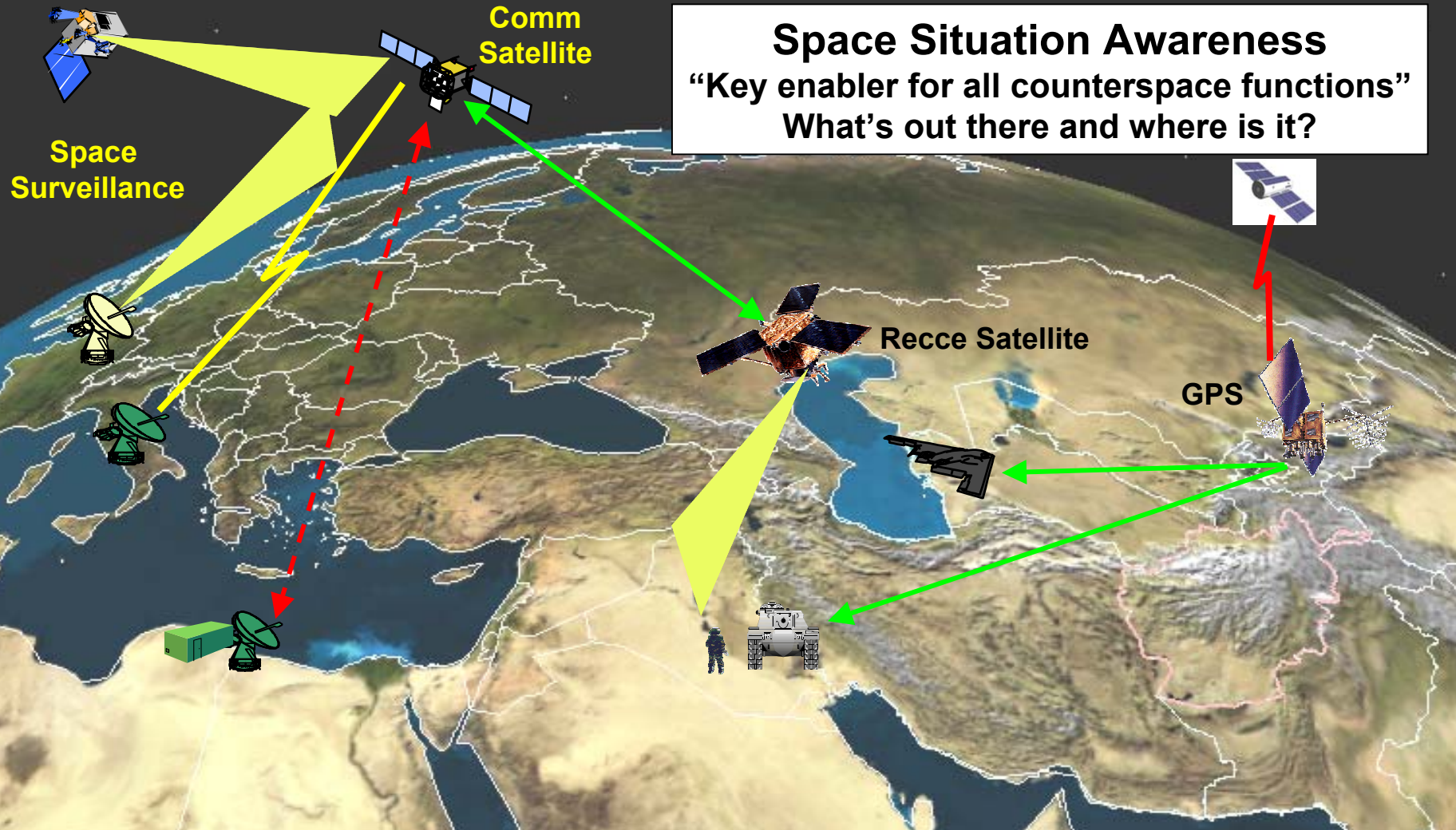




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# *Technology-to-Warfighting*

## *Space Control*



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# ***Technology-to-Warfighting Launch Systems***

## **Titan**

**Capability:**

- 47,800 Lbs (LEO)
- 12,700 Lbs (GEO)

**Payloads:**

- DSP
- COMM (MILSTAR)
- DMSP/POES
- NRO



## **Atlas IIA**

**Capability:**

- 16,000 Lbs (LEO)
- 3,500 Lbs (GEO)

**Payloads:**

- DSCS
- Commercial



## **Delta II**

**Capability:**

- 11,100 Lbs (LEO)
- 2,000 Lbs (GEO)

**Payloads:**

- GPS
- Commercial
- NASA



## **Atlas V**



Medium



Intermediate



Heavy

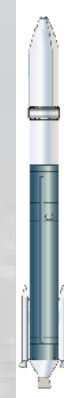
## **Evolved Expendable Launch Vehicle (EELV)**

- Family of vehicles with varying lift capabilities
- Medium and Heavy lift capability
- DoD industry partnership
- First DoD launch - 10 Mar 03  
DSCS A3 on Delta IV

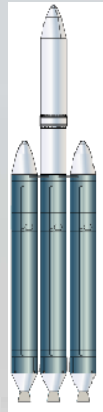
## **Delta IV**



Medium



Intermediate



Heavy

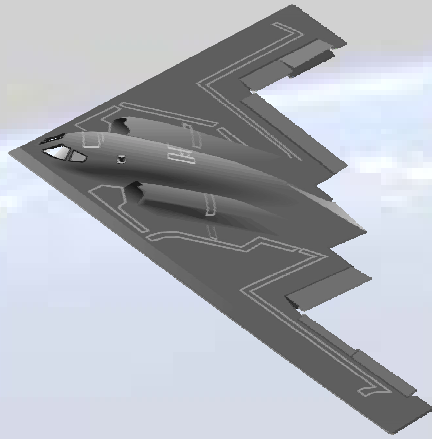
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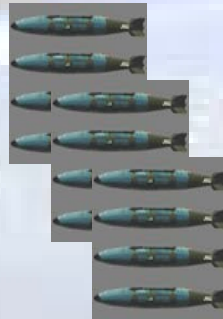
# *With Space*

Position, Navigation and Timing - GPS  Precision Engagement



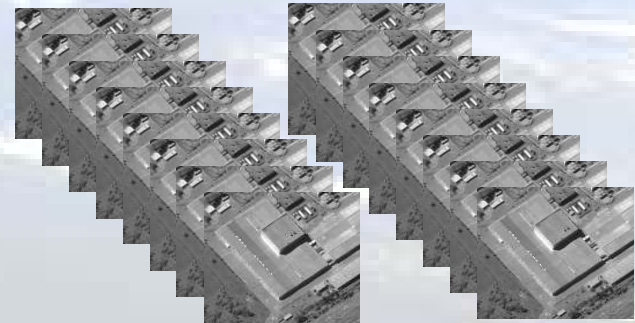
1 X B-2

X



16 X JDAM

=



16 Targets  
CEP = 20'

**In some cases, a single aircraft and one PGM during the Gulf War achieved the same result as a 1000-plane raid with over 9000 bombs in World War II – and without the associated collateral damage.**



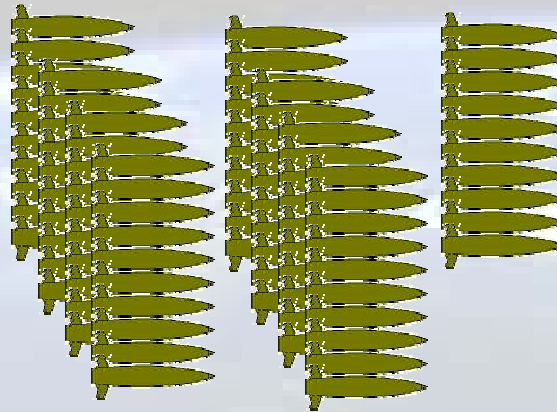
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# Without Space


WW-II



B-17 X 1000



250lb X 9000

 = 100

=



1 Target  
CEP = 3300'

**Even when control of the air was wrested from the Luftwaffe in the spring of 1944 and Allied aircraft were free to roam the Axis skies, the level of “precision” bombing still required a thousand aircraft to succeed against one target.**

*US Strategic Bombing Survey Report 1945*





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# ***Desert Storm to Today***

## ***Desert Storm***

Weather dependent

Precision targeting

F-117, F-15E, F-111



***2003***

Day/Night All weather

Precision targeting

F-117, F-15E, F-16

B-1, B-2, B-52

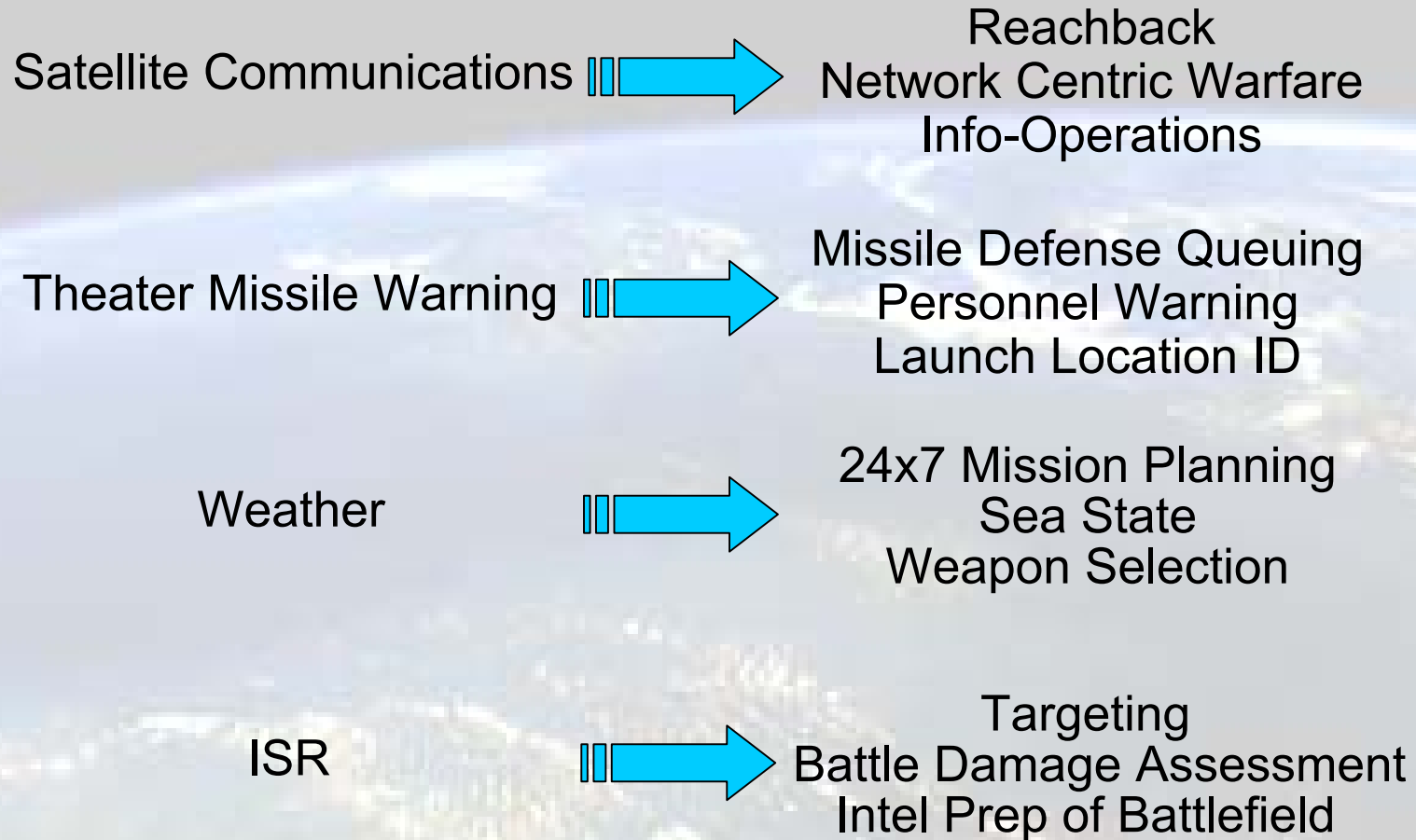
**~9% Precision Guided Munitions**

**~70% in OEF**



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# ***With Space***



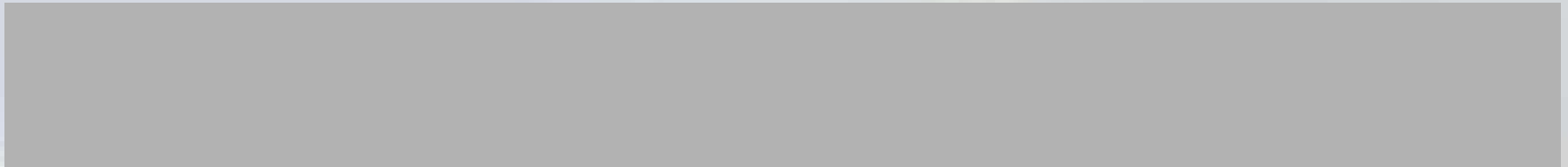
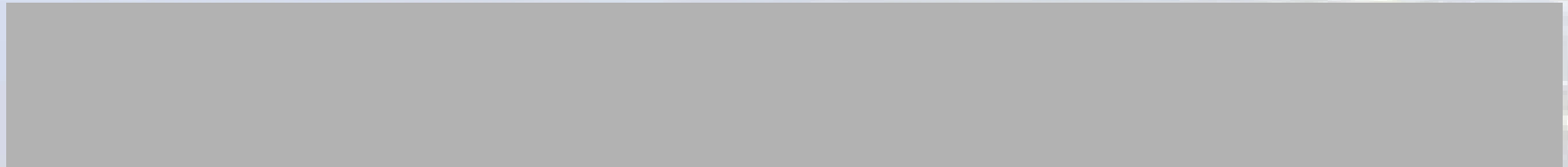




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# ***Without Space***



**More Personnel in Harms Way**

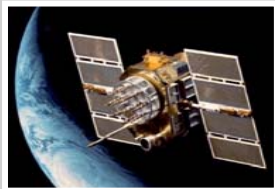
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# Integrating Operations: F2T2EA



**Navigation**



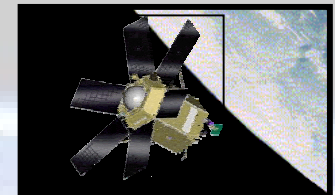
**Communication**



**Weather**



**Warning**



**Intel**

**H-6**

**H-5**

**H-4**

**H**

**H+1**

**Imagery of Target**

**Weather Data**

**Battlespace  
Characterization**

**Target Development**

**BDA Imagery**



**UNDAMAGED  
CIVILIAN  
FARM HOUSE**



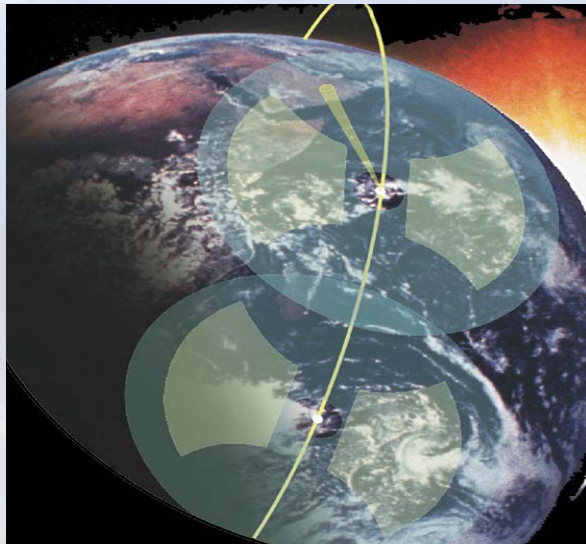
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# ***Air Force Objective***

***To provide the nation with the best  
military capabilities in, to,  
through, and from space***



***.....No one comes close***

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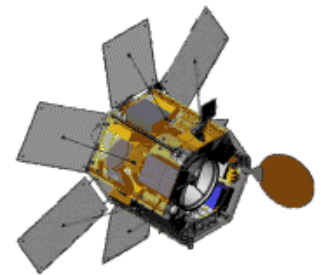


***Today. . .***



***Space is how we:***

- Detect missiles
- Command and control forces
- Gather and disseminate intelligence
- Target our weapons
- Focus logistics
- Navigate on the ground.



***. . . Space enables all we do !***





# ***Army Space Support to Operation Enduring Freedom***

- Tactical Exploitation System
- Blue Force Tracking
- Missile Early Warning
- Army Space Support Teams.





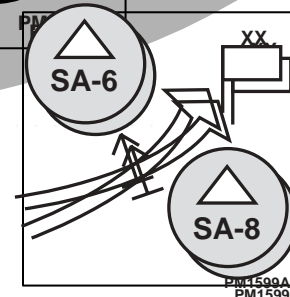
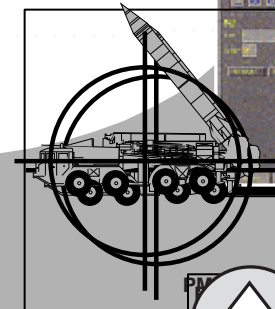
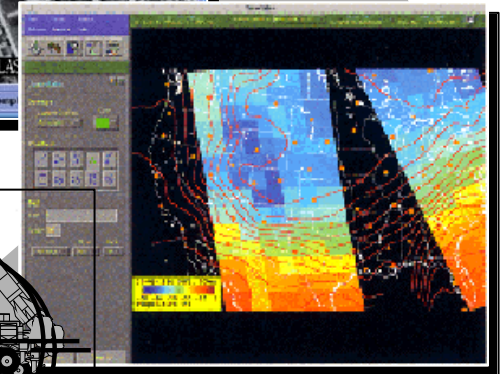
# ***The U.S. Army Relies On Space***

## **Raw Data/Information**

- Theater, National, and selected Tactical Imagery
- Theater & National SIGINT
- Missile Warning
- Weather (P3I)
- Blue Force Tracking/Situational Awareness
- Foreign Satellite Orbits/Capabilities
- Database/Message/Home Page Reach

## **Uses**

- Deep Targeting Support
- Situation Awareness
- Situation Understanding
- Intelligence Preparation of the Battlefield (IPB)
- Terrain Recon
- Electronic Mapping
- Battle Damage Assessment







*"Our space assets now are probably more important to warfighters and more important to our ability to win this global war on terrorism than they ever have been . . . Clearly, space is the high ground, and we need to capture that high ground and exploit it "*

*Peter Teets  
Undersecretary of the Air Force  
and Director, NRO  
Feb 2003*